



# Department of Environmental Quality



To protect, conserve and enhance the quality of Wyoming's environment for the benefit of current and future generations.

Dave Freudenthal, Governor

John Corra, Director

January 4, 2010

Mr. Michael Shaffron, P.E.  
Air Quality Specialist, North Rockies  
EnCana Oil & Gas (USA) Inc.  
370 17th Street, Suite 1700  
Denver, CO 80202

Permit No. CT-8122

Dear Mr. Shaffron:

The Division of Air Quality of the Wyoming Department of Environmental Quality has completed final review of EnCana Oil & Gas (USA) Incorporated's voluntary permit application to establish federally enforceable conditions for the Drill Rig Fleet located in the Jonah and Pinedale Anticline Development Area (JPDA) in Sublette County, Wyoming.

Following this agency's proposed approval of the request as published September 25, 2009 and in accordance with Chapter 6, Section 2(m) of the Wyoming Air Quality Standards and Regulations, the public was afforded a 30-day period in which to submit comments concerning the proposed new source, and an opportunity for a public hearing. Public comments were received during the comment period and public hearing held November 18, 2009 and have been considered in the final permit. Therefore, on the basis of the information provided to us, approval to construct the Drill Rig Fleet as described in the application is hereby granted pursuant to Chapter 6, Section 2 of the regulations with the following conditions:

1. That authorized representatives of the Division of Air Quality be given permission to enter and inspect any property, premise or place on or at which an air pollution source is located or is being constructed or installed for the purpose of investigating actual or potential sources of air pollution and for determining compliance or non-compliance with any rules, standards, permits or orders.
2. That all substantive commitments and descriptions set forth in the application for this permit, unless superseded by a specific condition of this permit, are incorporated herein by this reference and are enforceable as conditions of this permit.
3. That all notifications, reports and correspondences associated with this permit shall be submitted to the Stationary Source Compliance Program Manager, Air Quality Division, 122 West 25th Street, Cheyenne, WY 82002 and a copy shall be submitted to the District Engineer, Air Quality Division, 510 Meadowview Drive, Lander, WY 82520.
4. This permit only applies to the EnCana Oil & Gas (USA) Inc. Drill Rig Fleet while operating in the Jonah and Pinedale Anticline Development Area (JPDA). The permit conditions contained herein are only enforceable while operating drill rigs in the JPDA.
  - i. The JPDA area consists of 109W & R110W in T34N, R109W & R110W in T33N, R108W, R109W & R110W in T32N, R108W, R109W & R110W in T31N, R107W, R108W & R109W in T30N, R107W, R108W & R109W in T29N, R108W & R109W in T28N, and R107W, R108W & R109W in T27N.

Herschler Building • 122 West 25th Street • Cheyenne, WY 82002 • <http://deq.state.wy.us>

ADMIN/OUTREACH  
(307) 777-7937  
FAX 777-3610

ABANDONED MINES  
(307) 777-6145  
FAX 777-6462

AIR QUALITY  
(307) 777-7391  
FAX 777-5616

INDUSTRIAL SITING  
(307) 777-7369  
FAX 777-5973

LAND QUALITY  
(307) 777-7756  
FAX 777-5864

SOLID & HAZ. WASTE  
(307) 777-7752  
FAX 777-5973

WATER QUALITY  
(307) 777-7781  
FAX 777-5973



5. That written notification of the actual date of initial start-up for each drill rig/engine/boiler is required fifteen (15) days after start-up as defined in Condition 8. Such notification shall be submitted on a complete AQD-RIG Installation/Removal form. The form can be downloaded from the Air Quality website <http://deq.state.wy.us/aqd> or obtained from the Air Quality Division.
6. That upon removal of a drill rig/engine/boiler from the JPDA, written notification is required within fifteen (15) days of removal. Such notification shall be submitted on a complete AQD-RIG Installation/Removal form.
7. That emissions shall be limited as follows:
  - i. Total actual annual NO<sub>x</sub> emissions from all drill rig engines and boilers associated with the EnCana Oil & Gas (USA) Inc. Drill Rig Fleet shall not exceed 282.0 tons per year (tpy) NO<sub>x</sub>.
  - ii. Emissions from the natural gas fired drill rig engines in the EnCana Oil & Gas (USA) Inc. Drill Rig Fleet shall not exceed the values in the following table.

Equipment	NO <sub>x</sub>	CO	Formaldehyde
	g/hp-hr	g/hp-hr	g/hp-hr
Natural Gas Engines	1.49	0.5	0.07

1. Lean burn engines shall be equipped with oxidation catalyst.
  2. Rich burn engines shall be equipped with NSCR and an AFRC.
- iii. Total actual annual NO<sub>x</sub> emissions from engines on any diesel fired drill rig in the EnCana Oil & Gas (USA) Inc. Drill Rig Fleet shall not exceed 10 tpy per drill rig. This requirement shall be effective January 1, 2010.
  1. That should EnCana Oil & Gas (USA) Inc. elect to install add-on NO<sub>x</sub> control systems on any diesel engine(s), this permit shall be modified prior to start-up with the controls.
8. EnCana Oil & Gas (USA) Inc. shall conduct an initial performance test for each drill rig engine no later than ninety (90) days after start-up. Startup shall be defined as follows:
  - i. For drill rig engines in service at the time of permit issuance, the start-up date shall be the permit issuance date.
  - ii. For all other drill rig engines, the start-up date shall be the date the rig commences drilling at the first well.

9. Initial performance testing as required by Condition 8 of this permit shall be conducted on the drill rig engines as follows:

- i. Natural gas fired engines

NO<sub>x</sub> and CO Emissions: Testing for NO<sub>x</sub> and CO emissions shall consist of three (3) 1-hour tests following EPA approved reference methods or the State of Wyoming's Portable Analyzer protocol to determine compliance with the g/hp-hr limits. Results shall be reported in terms of g/hp-hr. Emissions shall be calculated using the following equations:

$$g/hp - hr NO_x = (ppm NO_{x\ corrected})(1.19 \times 10^{-7})(F\_factor)(\frac{20.9}{20.9 - O_2\%_{corrected}})$$

$$(Brake\ Specific\ Fuel\ Consumption(Btu / hp - hr))(10^{-6})(454)$$

$$g/hp - hr CO = (ppm CO_{corrected})(7.27 \times 10^{-8})(F\_factor)(\frac{20.9}{20.9 - O_2\%_{corrected}})$$

$$(Brake\ Specific\ Fuel\ Consumption(Btu / hp - hr))(10^{-6})(454)$$

VOC Emissions: Testing for VOCs shall be conducted in accordance with a Division approved test method for one (1) engine of each engine type in the fleet.

Formaldehyde Emissions (Lean Burn Engines Only): Each engine shall be tested for formaldehyde. Testing shall consist of three (3) 1-hour tests following EPA approved reference methods or a Division approved formaldehyde test method. Emissions shall be calculated using the following equation:

$$g/hp - hr HCHO = (ppm HCHO_{corrected})(7.79 \times 10^{-8})(F\_factor)(\frac{20.9}{20.9 - O_2\%_{corrected}})$$

$$(Brake\ Specific\ Fuel\ Consumption(Btu / hp - hr))(10^{-6})(454)$$

ii. Diesel fired engines

NO<sub>x</sub> Emissions: Testing for NO<sub>x</sub> shall consist of three (3) 1-hour tests following EPA approved reference methods or the State of Wyoming's Portable Analyzer protocol. Emissions shall be calculated using the equation in Condition 9(i) above. Results shall be reported in terms of g/hp-hr.

VOC Emissions: Testing for VOCs shall be conducted in accordance with a Division approved test method for one (1) engine of each engine type in the fleet.

A test protocol shall be submitted for review and approval prior to testing. Notification of the test date shall be provided to the Division fifteen (15) days prior to testing. Results shall be submitted to the Division within forty-five (45) days of completion. Engine load (%) and brake specific fuel consumption (BSFC) shall be provided in the report.

10. That each drill rig engine shall be tested annually. The first annual test is required the following calendar year after completion of the initial performance tests required under Condition 8.
- i. For natural gas engines, testing for NO<sub>x</sub> and CO shall be conducted in accordance with EPA approved reference methods or the State of Wyoming's Portable Analyzer protocol. Compliance with the CO limits is considered verification that the VOC and formaldehyde emissions for the lean burn engines are controlled. Emissions shall be calculated using the equations listed in Condition 9.
  - ii. For diesel engines, testing for NO<sub>x</sub> shall be conducted in accordance with EPA approved reference methods or the State of Wyoming's Portable Analyzer protocol. Emissions shall be calculated using the equation listed in Condition 9.
  - iii. A test protocol shall be submitted for review and approval prior to testing. Notification of the test date shall be provided to the Division fifteen (15) days prior to the testing. Results shall be submitted to the Division with forty-five (45) days of completing the tests. The engine load (%) and brake specific fuel consumption (BSFC) shall be provided in the report.
  - iv. The Air Quality Division shall be notified within twenty-four (24) hours of the testing/monitoring required by this condition that shows operation outside the permitted emission limits. By no later than seven (7) calendar days of such testing/monitoring event, the owner or operator shall repair and retest/monitor the affected engine to demonstrate that the engine has been returned to operation within the permitted emission limits. Compliance with this permit condition regarding repair and retesting/monitoring shall not be deemed to limit the authority of the Air Quality Division to cite the owner or operator for an exceedance of the permitted emission limits for any testing/monitoring required by this condition which shows noncompliance.

11. That EnCana Oil & Gas (USA) Inc. shall follow the monitoring and maintenance requirements as follows for the natural gas fired drill rig engines equipped with an oxidation catalyst or NSCR catalyst.

i. Operate and maintain the engine, air pollution control equipment, and monitoring equipment according to good air pollution control practices at all times, including startup, shutdown, and malfunction.

ii. Install a thermocouple to measure the inlet catalyst temperature.

a. The inlet temperature shall be recorded at least monthly. If the temperature is outside of the range listed below, corrective action shall be taken.

NSCR Catalyst:	750 °F to 1250 °F
Oxidation Catalyst:	450 °F to 1350 °F

iii. Install a device to measure the pressure drop across the catalyst.

a. The pressure drop across the catalyst shall be recorded at least monthly. If the pressure changes by more than two (2) inches of water from the pressure drop as determined below, corrective action shall be taken.

1. During the initial performance test required by this permit, the reference pressure drop shall be established. When the catalyst is replaced, the reference pressure drop shall be reestablished during the subsequent periodic testing required by this permit.

iv. Records of catalyst inlet temperature, pressure drop, and any maintenance or corrective actions shall be kept and maintained for a period of five (5) years and shall be made available to the Division upon request.

v. In lieu of monitoring catalyst inlet temperature and pressure drop, EnCana Oil & Gas (USA) Inc. may submit for approval an alternative monitoring plan. If approved, the Division will administratively amend this permit to incorporate the alternative monitoring plan.

12. EnCana Oil & Gas (USA) Inc. shall keep records of the following for each well drilled.
- i. Drill Rig ID
  - ii. Well API number
  - iii. Well name
  - iv. Well location (longitude, latitude, elevation)
  - v. Drilling start and end dates
  - vi. Field name
  - vii. Equipment description, controls, and site rating
  - viii. Brake specific fuel consumption (BSFC)
  - ix. Total fuel usage for drill rig engines and boilers recorded on a daily basis
  - x. Heat content and sulfur content of fuel burned recorded from supplier certification
  - xi. Actual emissions for NO<sub>x</sub>, CO, VOC, SO<sub>2</sub>, PM<sub>10</sub>, ammonia, and formaldehyde
    1. For engines, emissions shall be based on fuel consumption, g/hp-hr emission rates, and BSFC from the latest emissions test.
    2. For boilers, emissions shall be based on fuel consumption, lb/MMBtu rates or AP-42 factors converted to lb/MMBtu, and BSFC


The format presented in Appendix A shall be utilized to satisfy reporting requirements for the Division's annual emission inventory, which shall be submitted by March 31 of the following calendar year.

13. That drill rigs, boilers or engines that are subject to the conditions of this permit may be replaced without modifying this permit. EnCana Oil & Gas (USA) Inc. shall provide notifications as required by Conditions 5 and 6 of this permit. The replacement drill rig/engine(s)/boiler(s) shall comply with the conditions of this permit.
14. All records required under this permit shall be kept for a period of at least five (5) years and shall be made available to the Division upon request.
15. This permit only authorizes drill rig engines and replacement engines to remain at any pad for less than twelve (12) consecutive months.
16. EnCana Oil & Gas (USA) Inc. shall comply with all local, state, and federal rules and regulations applicable to the Drill Rig Fleet.


It must be noted that this approval does not relieve you of your obligation to comply with all applicable county, state, and federal standards, regulations or ordinances. Special attention must be given to Chapter 6, Section 2 of the Wyoming Air Quality Standards and Regulations. Any appeal of this permit as a final action of the Department must be made to the Environmental Quality Council within sixty (60) days of permit issuance per Section 16, Chapter I, General Rules of Practice and Procedure, Department of Environmental Quality.

If we may be of further assistance to you, please feel free to contact this office.

Sincerely,



David A. Finley  
Administrator  
Air Quality Division



John V. Corra  
Director  
Dept. of Environmental Quality

cc: Tony Hoyt

# **Appendix A**

## **Drill Rig Emission Reporting Form**



Drill Rig Locations & Emissions

(Sample data entries provided below)  
List all wells drilled by each rig, showing the order of progression of wells drilled throughout the year  
(Add additional rows as needed to provide data for each well drilled)  
Input negative values for Rig Boilers under column heading "Site Rating"  
\* Use emission factors from actual test data and attach test results inclusive of tested rate  
\*\* Emission factors from manufacturer or AP-42 may be used if test data is not available

Rig ID	Equipment Description	Controls	API #	Location (WGS84)			Well Name	Field Name	Well Spud Date	Formation	Drilling Start Date	Drilling End Date	Well Depth	Site Rating	Hours Operated to Drill Well	Natural Gas Use per Well	Heat Content Natural Gas	Diesel Fuel Use per Well	Heat Content Diesel Fuel	Diesel Sulfur Content	Heat Input of Fuel	BSFC	Drill Rig Emission Factors					Emissions from Drilling					Stack Parameters																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
				Lat	Long	Elev feet																	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	HCHO	NO <sub>x</sub>	CO	VOC	PM <sub>10</sub>	HCHO	SO <sub>2</sub>	Height	Temp	Velocity	Diameter																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
Rig #1 - H&P 000	Cat 3512CDITA Diesel	Tier 2	49-035-25938	42.47183	-109.70750	7.179	Stud Horse Butte 41-22	Jonah	12/16/07	Lance	2/3/08	2/14/08	11,751	hp or (MMBtu/hr)		mscf	Btu/scf	gal	Btu/gal	ppm <sub>w</sub>	MMBtu	Btu/hp-hr	4.80	8.50	1.00	0.40	0.00	1.44	2.54	0.30	0.12	0.00	0.05	16.40	630.55	98.40	0.66																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
	Cat 3512CDITA Diesel	Tier 2												1,476	288		1,000	15,431	130,000	500	2,006	7,389	4.80	8.50	1.00	0.40	0.00	1.44	2.54	0.30	0.12	0.00	0.05	16.40	630.55	98.40	0.66																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
	Rig Boiler	None												(6.3)	144		1,000	4,209	130,000	500	547	7,000	(0.15)	(0.036)	(0.0022)	(0.015)	(0.00045)	0.04	0.01	0.00	0.00	0.00	0.01	13.00	344.00	17.50	1.29																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
Rig #1 - H&P 000	Cat 3512CDITA Diesel	Tier 2	49-035-25752	42.47132	-109.70708	7.187	Stud Horse Butte 41-22	Jonah	12/13/07	Lance	2/24/08	3/6/08	11,679	1,476	284		1,000	3,628	130,000	500	472	6,782	4.80	8.50	1.00	0.40	0.00	0.37	0.65	0.08	0.03	0.00	0.01	16.40	630.55	98.40	0.66																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
	Cat 3512CDITA Diesel	Tier 2												1,476	264		1,000	3,628	130,000	500	472	6,782	4.80	8.50	1.00	0.40	0.00	0.37	0.65	0.08	0.03	0.00	0.01	16.40	630.55	98.40	0.66																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
	Rig Boiler	None												(6.3)	123		1,000	1,052	130,000	500	137	6,200	(0.15)	(0.036)	(0.0022)	(0.015)	(0.00045)	0.01	0.00	0.00	0.00	0.00	0.00	13.00	344.00	17.50	1.29																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
3rd well drilled using Rig #1 - H&P 000 (Continue for next well drilled using Rig #1 -- following the above format)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		

# Drill Rig Emissions - 2009

## Diesel Fuel Consumption

(Sample data entries provided below for January through December 2009)

2009 Drill Rig Diesel Fuel Consumption												
	Rig #1 (gallons)	Rig #2 (gallons)	Rig #3 (gallons)	Rig #4 (gallons)	Rig #5 (gallons)	Rig #6 (gallons)		Rig	Wells	Jan (gallons)	Totals (gallons)	
January												
1	1,600	1,850	1,572	1,800	2,070	1,755		Rig #1	Well #1	41,995	41,995	
2	1,700	2,054	2,390	1,800	1,380	1,990			Well #2	-	-	
3	1,500	1,848	1,572	1,800	2,070	1,726					41,995	
4	1,500	1,221	1,889	1,440	1,380	1,274		Rig #2	Well #3	19,696	19,696	
5	1,600	1,848	1,753	1,800	2,300	1,345			Well #4	37,138	37,138	
6	1,000	2,054	1,591	1,620	1,840	978			Well #5	-	-	
7	600	1,848	1,591	1,620	1,870	745					56,834	
8	1,000	2,054	1,462	1,400	1,840	1,734		Rig #3	Well #6	31,060	31,060	
9	1,200	811	1,809	1,620	1,610	1,453			Well #7	19,579	19,579	
10	1,200	1,848	1,572	1,620	1,840	2,387			Well #8	-	-	
11	1,500	1,233	1,594	1,440	1,610	1,750					50,639	
12	1,200	1,027	1,978	1,440	1,840	1,991		Rig #4	Well #9	42,580	42,580	
13	1,300	1,027	1,897	1,800	1,840	1,866			Well #10	8,620	8,620	
14	1,300	1,307	2,341	1,700	1,810	1,945			Well #11	-	-	
15	1,122	2,054	1,992	1,440	1,610	1,990					51,200	
16	1,496	1,849	1,580	1,800	1,840	1,876		Rig #5	Well #12	23,490	23,490	
17	1,122	1,849	1,343	1,620	1,840	1,623			Well #13	33,510	33,510	
18	1,122	2,054	1,134	1,080	1,840	1,724			Well #14	-	-	
19	855	1,950	1,773	2,340	1,810	1,920					57,000	
20	1,496	2,259	1,787	1,660	2,070	1,395		Rig #6	Well #15	9,068	9,068	
21	1,870	1,644	1,591	2,180	1,840	1,785			Well #16	38,110	38,110	
22	1,663	2,054	1,609	1,980	1,840	1,484			Well #17	-	-	
23	1,496	2,865	2,112	1,580	1,820	1,747			Well #18	-	-	
24	2,203	2,259	1,521	1,620	1,840	1,789					47,178	
25	1,309	1,843	1,572	1,280	2,300	1,885						
26	1,496	2,157	1,594	900	1,820	1,824						
27	1,309	1,851	1,585	1,700	2,070	1,950						
28	1,309	2,054	1,608	1,980	1,840	1,769						
30	1,309	2,054	1,608	1,980	1,840	1,769						
31	1,309	2,054	1,608	1,980	1,840	1,769						
Subtotal	41,995	56,834	50,639	51,200	57,000	47,178						
February												
1	1,600	1,850	1,572	1,800	2,070	1,755		Rig #1	Well #1	38,068	38,068	
2	1,700	2,054	2,390	1,800	1,380	1,990			Well #2	-	-	
3	1,500	1,848	1,572	1,800	2,070	1,726					38,068	
4	1,500	1,221	1,889	1,440	1,380	1,274		Rig #2	Well #3	19,696	19,696	
5	1,600	1,848	1,753	1,800	2,300	1,345			Well #4	30,976	30,976	
6	1,000	2,054	1,591	1,620	1,840	978			Well #5	-	-	
7	600	1,848	1,591	1,620	1,870	745					50,672	
8	1,000	2,054	1,462	1,400	1,840	1,734		Rig #3	Well #6	31,060	31,060	
9	1,200	811	1,809	1,620	1,610	1,453			Well #7	14,755	14,755	
10	1,200	1,848	1,572	1,620	1,840	2,387			Well #8	-	-	
11	1,500	1,233	1,594	1,440	1,610	1,761					45,815	
12	1,200	1,027	1,978	1,440	1,840	1,991		Rig #4	Well #9	42,580	42,580	
13	1,300	1,027	1,897	1,800	1,840	1,866			Well #10	2,680	2,680	
14	1,300	1,307	2,341	1,700	1,810	1,945			Well #11	-	-	
15	1,122	2,054	1,992	1,440	1,610	1,990					45,260	
16	1,496	1,849	1,580	1,800	1,840	1,876		Rig #5	Well #12	23,490	23,490	
17	1,122	1,849	1,343	1,620	1,840	1,623			Well #13	27,990	27,990	
18	1,122	2,054	1,134	1,080	1,840	1,724			Well #14	-	-	
19	855	1,950	1,773	2,340	1,810	1,920					51,480	
20	1,496	2,259	1,787	1,660	2,070	1,395		Rig #6	Well #15	9,068	9,068	
21	1,870	1,644	1,591	2,180	1,840	1,785			Well #16	35,803	35,803	
22	1,663	2,054	1,609	1,980	1,840	1,484			Well #17	-	-	
23	1,496	2,865	2,112	1,580	1,820	1,747			Well #18	-	-	
24	2,203	2,259	1,521	1,620	1,840	1,789					44,871	
25	1,309	1,843	1,572	1,280	2,300	1,885						
26	1,496	2,157	1,594	900	1,820	1,824						
27	1,309	1,851	1,585	1,700	2,070	1,950						
28	1,309	2,054	1,608	1,980	1,840	1,769						
Subtotal	38,068	50,672	45,815	45,260	51,480	44,871						
March												
1	1,500	1,427	1,989	2,180	1,840	731		Rig #1	Well #1	5,200	5,200	
2	800	1,848	1,591	1,620	1,870	1,597			Well #2	31,822	31,822	
3	900	2,259	1,939	1,800	1,840	2,498					37,022	
4	1,200	1,848	1,903	1,950	1,840	883		Rig #2	Well #3	-	-	
5	800	1,848	1,294	1,280	1,850	1,303			Well #4	10,656	10,656	
6	800	605	1,739	1,800	1,510	1,845			Well #5	38,856	38,856	
7	800	621	1,089	1,620	1,080	1,591					49,512	
8	950	621	1,870	1,440	480	1,877		Rig #3	Well #6	-	-	
9	1,500	1,233	1,870	1,440	600	2,162			Well #7	22,447	22,447	
10	600	1,233	1,910	1,440	1,610	1,733			Well #8	25,588	25,588	
11	1,800	1,849	1,970	1,440	2,070	1,738					48,035	
12	1,150	1,643	1,594	1,440	1,840	1,594		Rig #4	Well #9	-	-	
13	1,150	1,849	1,935	1,440	1,840	1,598			Well #10	37,400	37,400	
14	1,500	1,233	1,000	1,620	1,730	1,685			Well #11	10,270	10,270	
15	1,225	1,643	1,250	1,520	1,630	1,658					47,670	
16	1,455	2,054	1,630	1,620	1,610	1,658		Rig #5	Well #12	-	-	
17	1,355	1,643	1,170	1,450	1,840	2,839			Well #13	10,730	10,730	
18	1,300	1,849	1,591	1,800	1,590	1,873			Well #14	41,160	41,160	
19	1,122	2,054	1,591	1,800	2,070	1,192					51,890	
20	1,122	811	1,522	1,800	1,370	600		Rig #6	Well #15	-	-	
21	1,496	1,643	1,701	1,800	2,070	600			Well #16	-	-	
22	1,122	1,643	1,168	1,250	1,870	1,50			Well #17	38,736	38,736	
23	1,455	2,054	1,597	1,080	1,500	650			Well #18	4,119	4,119	
24	1,122	2,054	1,594	1,540	2,070	1,012					42,855	
25	1,309	1,233	1,572	750	2,070	720						
26	1,122	800	1,705	1,250	1,870	650						
27	1,309	1,433	1,158	1,880	1,830	620						
28	1,122	1,643	1,580	1,720	1,910	650						
29	1,850	2,054	1,898	1,820	1,840	898						
30	1,500	2,540	1,674	1,620	1,610	998						
31	1,500	1,426	1,124	1,620	1,850	1,133						
Subtotal	37,022	49,512	48,035	47,670	51,890	42,855						

# Drill Rig Emissions - 2009

## Natural Gas Consumption

(Sample data entries provided below for January through December 2009)

2009 Drill Rig Natural Gas Consumption												
	Rig #1 (gallons)	Rig #2 (gallons)	Rig #3 (gallons)	Rig #4 (gallons)	Rig #5 (gallons)	Rig #6 (gallons)		Rig	Wells	Jan (gallons)	Totals (gallons)	
January												
1	1,600	1,850	1,572	1,800	2,070	1,755		Rig #1	Well #1	41,995	41,995	
2	1,700	2,054	2,390	1,800	1,380	1,890			Well #2	-	-	
3	1,500	1,848	1,572	1,800	2,070	1,726				-	41,995	
4	1,500	1,221	1,889	1,440	1,380	1,274		Rig #2	Well #3	19,696	19,696	
5	1,600	1,848	1,753	1,800	2,300	1,345			Well #4	37,138	37,138	
6	1,000	2,054	1,591	1,620	1,840	978			Well #5	-	-	
7	600	1,848	1,591	1,620	1,870	745				-	56,834	
8	1,000	2,054	1,462	1,400	1,840	1,794		Rig #3	Well #6	31,060	31,060	
9	1,200	811	1,809	1,620	1,610	1,453			Well #7	19,579	19,579	
10	1,200	1,848	1,572	1,620	1,840	2,397			Well #8	-	-	
11	1,500	1,233	1,594	1,440	1,610	1,761				-	50,639	
12	1,200	1,027	1,978	1,440	1,840	1,991		Rig #4	Well #9	42,580	42,580	
13	1,300	1,027	1,897	1,800	1,840	1,866			Well #10	8,620	8,620	
14	1,300	1,307	2,341	1,700	1,840	1,945			Well #11	-	-	
15	1,122	2,054	1,992	1,440	1,610	1,990				-	51,200	
16	1,496	1,848	1,580	1,800	1,840	1,876		Rig #5	Well #12	23,490	23,490	
17	1,122	1,848	1,343	1,620	1,840	1,623			Well #13	33,510	33,510	
18	1,122	2,054	1,134	1,080	1,840	1,724			Well #14	-	-	
19	855	1,950	1,776	2,340	1,810	1,920				-	57,000	
20	1,496	2,259	1,797	1,860	2,070	1,395		Rig #6	Well #15	9,068	9,068	
21	1,870	1,848	1,591	2,180	1,840	1,765			Well #16	38,110	38,110	
22	1,663	2,054	1,608	1,980	1,840	1,484			Well #17	-	-	
23	1,496	2,865	2,112	1,580	1,820	1,747			Well #18	-	-	
24	2,203	2,259	1,521	1,620	1,840	1,768				-	47,178	
25	1,309	1,643	1,572	1,280	2,300	1,985				-	-	
26	1,496	2,157	1,594	900	1,820	1,824				-	-	
27	1,309	1,851	1,586	700	2,070	1,950				-	-	
28	1,309	2,054	1,608	1,980	1,840	1,769				-	-	
29	1,309	2,054	1,608	1,980	1,840	1,769				-	-	
30	1,309	2,054	1,608	1,980	1,840	1,769				-	-	
31	1,309	2,054	1,608	1,980	1,840	1,769				-	-	
Subtotal	41,995	56,834	50,639	51,200	57,000	47,178						

	Rig #1 (gallons)	Rig #2 (gallons)	Rig #3 (gallons)	Rig #4 (gallons)	Rig #5 (gallons)	Rig #6 (gallons)		Rig	Wells	Feb (gallons)	Totals (gallons)	
February												
1	1,600	1,850	1,572	1,800	2,070	1,755		Rig #1	Well #1	38,068	38,068	
2	1,700	2,054	2,390	1,800	1,380	1,890			Well #2	-	-	
3	1,500	1,848	1,572	1,800	2,070	1,726				-	38,068	
4	1,500	1,221	1,889	1,440	1,380	1,274		Rig #2	Well #3	19,696	19,696	
5	1,600	1,848	1,753	1,800	2,300	1,345			Well #4	30,976	30,976	
6	1,000	2,054	1,591	1,620	1,840	978			Well #5	-	-	
7	600	1,848	1,591	1,620	1,870	745				-	50,672	
8	1,000	2,054	1,462	1,400	1,840	1,794		Rig #3	Well #6	31,060	31,060	
9	1,200	811	1,809	1,620	1,610	1,453			Well #7	14,755	14,755	
10	1,200	1,848	1,572	1,620	1,840	2,397			Well #8	-	-	
11	1,500	1,233	1,594	1,440	1,610	1,761				-	45,815	
12	1,200	1,027	1,978	1,440	1,840	1,991		Rig #4	Well #9	42,580	42,580	
13	1,300	1,027	1,897	1,800	1,840	1,866			Well #10	2,680	2,680	
14	1,300	1,307	2,341	1,700	1,840	1,945			Well #11	-	-	
15	1,122	2,054	1,992	1,440	1,610	1,990				-	45,260	
16	1,496	1,848	1,580	1,800	1,840	1,876		Rig #5	Well #12	23,490	23,490	
17	1,122	1,848	1,343	1,620	1,840	1,623			Well #13	27,990	27,990	
18	1,122	2,054	1,134	1,080	1,840	1,724			Well #14	-	-	
19	855	1,950	1,776	2,340	1,810	1,920				-	51,480	
20	1,496	2,259	1,797	1,860	2,070	1,395		Rig #6	Well #15	9,068	9,068	
21	1,870	1,848	1,591	2,180	1,840	1,765			Well #16	35,803	35,803	
22	1,663	2,054	1,608	1,980	1,840	1,484			Well #17	-	-	
23	1,496	2,865	2,112	1,580	1,820	1,747			Well #18	-	-	
24	2,203	2,259	1,521	1,620	1,840	1,768				-	44,871	
25	1,309	1,643	1,572	1,280	2,300	1,985				-	-	
26	1,496	2,157	1,594	900	1,820	1,824				-	-	
27	1,309	1,851	1,586	700	2,070	1,950				-	-	
28	1,309	2,054	1,608	1,980	1,840	1,769				-	-	
Subtotal	38,068	50,672	45,815	45,260	51,480	44,871						

	Rig #1 (gallons)	Rig #2 (gallons)	Rig #3 (gallons)	Rig #4 (gallons)	Rig #5 (gallons)	Rig #6 (gallons)		Rig	Wells	Mar (gallons)	Totals (gallons)	
March												
1	1,500	1,427	1,988	2,180	1,840	731		Rig #1	Well #1	5,200	5,200	
2	800	2,259	1,390	1,800	1,350	957			Well #2	31,822	31,822	
3	900	2,259	1,390	1,800	1,350	2,488				-	37,022	
4	1,200	1,848	1,903	1,980	1,940	626		Rig #2	Well #3	-	-	
5	800	1,948	1,294	1,280	1,850	1,203			Well #4	10,656	10,656	
6	800	1,605	1,739	1,800	1,510	1,845			Well #5	38,856	38,856	
7	800	1,821	1,988	1,620	1,080	1,631				-	49,512	
8	950	821	1,670	1,440	460	1,077		Rig #3	Well #6	-	-	
9	1,500	1,233	1,670	1,440	690	2,162			Well #7	22,447	22,447	
10	1,000	1,232	1,610	1,440	1,610	1,733			Well #8	25,588	25,588	
11	1,200	1,840	1,979	1,440	2,070	1,733				-	48,035	
12	1,150	1,843	1,594	1,440	1,840	1,594		Rig #4	Well #9	-	-	
13	1,150	1,849	1,595	1,440	1,840	1,656			Well #10	37,400	37,400	
14	1,500	1,232	1,000	1,620	1,730	1,685			Well #11	10,270	10,270	
15	1,122	1,845	1,250	1,520	1,610	1,639				-	47,670	
16	1,663	2,054	1,608	1,920	1,610	1,890		Rig #5	Well #12	-	-	
17	1,663	1,843	1,679	1,480	1,840	2,834			Well #13	10,730	10,730	
18	1,309	1,643	1,607	1,600	1,520	1,076			Well #14	41,160	41,160	
19	1,122	2,054	1,601	1,900	2,070	1,172				-	51,890	
20	1,122	811	1,622	1,600	1,970	600		Rig #6	Well #15	-	-	
21	1,496	1,840	1,701	1,800	2,070	600			Well #16	-	-	
22	1,122	1,643	1,168	1,260	1,870	760			Well #17	38,736	38,736	
23	1,455	2,054	1,597	1,080	1,560	650			Well #18	4,119	4,119	
24	1,122	2,054	1,684	1,640	2,070	1,042				-	42,855	
25	1,1309	1,232	1,672	750	2,070	720				-	-	
26	1,122	800	1,705	1,260	1,970	650				-	-	
27	1,1309	1,438	1,158	1,860	1,380	620				-	-	
28	1,122	1,843	1,580	1,720	1,610	650				-	-	
29	1,1500	2,054	1,395	1,620	1,840	688				-	-	
30	1,1500	2,054	1,395	1,620	1,840	688				-	-	
31	1,1500	1,428	1,121	1,620	1,390	1,128				-	-	
Subtotal	37,022	49,512	48,035	47,670	51,890	42,855						